THE BEGINNING OF THINGS

★

Corn from Egypt

by Maurice Gompertz

3/6

ANGUS & ROBERTSON LTD.
New & Secondhand Booksellers
Publishers to University

WITHDRAWN
UTSA LIBRARIES

THE BEGINNING OF THINGS

General Editor: G. Elliot Smith, F.R.S.

CORN FROM EGYPT

by Maurice Gompertz

EARLY VOLUMES

1 IN THE BEGINNING
G. Elliot Smith

2 NEW YEAR'S DAY
The Story of the Calendar
S. H. Hooke

3 CORN FROM EGYPT
The Beginning of Agriculture
M. Gompertz

4 ANCIENT MARINERS
The Story of Ships and Sea Routes
C. Daryll Forde

5 GODS AND MEN
The Attainment of Immortality
W. J. Perry

6 THE GOLDEN AGE
The Story of Human Nature
H. J. Massingham

In preparation:

POTS AND PANS
The Story of Ceramics
H. S. Harrison

THE THEATRE OF LIFE & DEATH
The Origin of the Drama
Ivor Brown

MAPS AND CHARTS
The Beginning of Geography
Irene Curnow

MYTHICAL MONSTERS
The Meaning of Symbolism
G. Elliot Smith

And many other volumes

Corn from Egypt

THE BEGINNING OF AGRICULTURE

by

MAURICE GOMPERTZ

B.A., PH.D. LOND.

LONDON:

GERALD HOWE LTD

23 SOHO SQUARE W.I

PRINTED IN GREAT BRITAIN 1927
ALL RIGHTS RESERVED

CONTENTS

CHAPTER		PAGE
I	ORIGIN OF AGRICULTURE	1
II	WHICH CIVILIZATION WAS EARLIEST?	6
III	ANCIENT IRRIGATION	13
IV	THE CEREALS	24
V	ANCIENT AGRICULTURAL IMPLEMENTS (WITH ILLUSTRATIONS)	33
VI	AGRICULTURE AND THE CALENDAR	46
VII	AGRICULTURE AND THE KINGSHIP	56
VIII	EGYPTIAN FARM LIFE	62
IX	BABYLONIAN AGRICULTURE	73
	MAP *Facing page*	1

AARONSOHN, A. Agricultural and Botanical Explorations in Palestine. 1910

BROWN, SIR H. Irrigation : its principles and practice. 1912

BROWN, SIR H. The Fayum and Lake Moeris.

BREASTED, J. H. Ancient Records of Egypt. 5 vols. 1906–7

CANDOLLE, A. DE. Origin of Cultivated Plants. (3rd Edition.) 1909

COOK, O. F. Wild Wheat in Palestine. (Bulletin 274, U.S.A. Dept. of Agriculture.) 1913

COULTER, J. M. Fundamentals of Plant-breeding. 1914

DAUBENY, C. G. Lectures on Roman Husbandry (page 96). 1857

GARDINER, A. H. Notes on the story of Sinuhe. 1916

GARDINER, A. H. Journal of Egyptian Archæology, Vol. II. April, 1915

LYONS, H. G. Physiography of the Nile Valley. 1906

MASPERO, E. Dawn of Civilization in Egypt and Chaldea. 1894

MEISSNER, B. Babylonien und Assyrien. 1920

PERCIVAL, J. The Wheat Plant. 1921

PERRY, W. J. Children of the Sun. 1923

PETRIE, SIR W. M. F. Tools and Weapons of Egypt. 1917

PETRIE, SIR W. M. F. Ancient Egypt. 1914–25

ROSTOVSTEV, M. I. A Large Estate in Egypt in 3rd Century B.C. 1922

SARGENT F. L. Corn Plants : their uses and ways of life. 1899

SAYCE, A. H. Social Life among the Babylonians and Assyrians.

SAYCE, A. H. Records of the Past. New Series, Volume III.

SMITH, G. ELLIOT. The Ancient Egyptians and the Origin of Civilization. 1923

TYLOR, E. B. Anthropology 1881

WEIGALL, A. History of the Pharaohs. 1925

WILLCOCKS, SIR W. Egyptian Irrigation. 1913

WILLCOCKS, SIR W. Irrigation in Mesopotamia. (2nd Edition.) 1917

WILKINSON, SIR G. Manners and Customs of the Ancient Egyptians. 2 vols. 1890

GREECE
CRETE
CYPRUS
Mediterranean Sea
Sidon
Tyre
Cyrenaica
Marmarica
LIBYA
Cairo
(Roda I.)
Fayum
EGYPT
Nile R.
Abydos
Elephantine
1st. Cataract
2nd. Cataract
3rd. Cataract
Red Sea
ABYSSINIA
ARABIA
Syrian Desert
MESOPOTAMIA
Nineveh
R. Tigris
R. Euphrates
ASSYRIA
AKKAD
Babylon
BABYLONIA
SUMER
CHALDEA
Eridu
Persian Gulf
Coast-line 5000 years ago
Fertile Land

CHAPTER I

ORIGIN OF AGRICULTURE

EVEN YOUNG people can remember the invention of wireless telephony; they are witnessing today the advent of wireless photography or television; and to-morrow they will be able to enjoy simultaneously the words of a play or the songs of an opera and a film of the action which accompanies the words. Older people whose memories go a little further back can remember the first motor-car, the first aeroplane, and the first submarine. But when an enquiring mind seeks to probe into the beginnings of fundamentals like the building of houses, the domestication of animals and plants, or the making of bread, it discovers that such activities as these go back to a time before written history.

This book is concerned with the origin of agriculture, with the domestication of plants and animals to the service of man. On first thoughts, it might be concluded that agriculture had always been practised everywhere, but so far is this from the truth that there still exist in several parts of the world, as in India, Central Africa, North America,

and Australia, communities which do not practise this craft. Indeed it must have been a difficult one to acquire in the first instance, though, once learnt, it might easily be copied and continued. For all investigation shows that before man thinks of *producing* food, he merely collects it as seeds, roots, fruits, or as the result of his hunting or fishing. At such a primitive stage, his only implement need be a pointed digging stick (see Fig. 1 on p. 33). The production of food on a large scale is the first step from primitive to civilized life, and it is the first step that counts.

Let us consider some of the difficulties facing a tribe which has not learnt the art of cultivation, but is still in what Mr. W. J. Perry has called the *food-gathering* stage. In many cases the ground must be cleared of trees to allow light and air to reach the growing crops; and the trunks of fallen trees and large stones must be removed to give the necessary space. To cut down large trees an axe is required, with a blade of very hard wood, or of stone, or of metal. Metal axe-heads would be used only after man had learnt the art of smelting ore, which did not happen until a later stage in the history of civilization.

Some barbarous tribes who have borrowed the art of agriculture from more civilized neighbours burn the trees which they cannot cut down. Tribes at this low stage of culture plant their seeds between the stumps which they cannot uproot, and so

obtain much smaller crops than would be possible if the same ground were completely cleared. Since these stumps make it impossible properly to plough such ground, its immediate fertility is exhausted after two or three years ; and the tribe moves on to another patch, where the same wasteful process is repeated. Such was the method of North American Indians for generations after the Spanish Conquest. These Indians merely scratched the ground between the stumps, scattered the maize seeds, and left prodigal Nature to do the rest.

The soil must be cleared of weeds before the seed is sown, or the crops will suffer owing to the competition of the weeds for air, light, and sustenance. In the tropics, such competition is acute. In British East Africa, for example, where three crops of corn could be grown annually, only two are obtained owing to the wastage of time and labour in clearing out the weeds which have grown with the crops. If modern civilized man with all his mechanical and scientific resources finds himself thus baulked of one-third of his crop, it is easy to see how the weed-problem would hamper primitive man when making his first agricultural experiments.

The soil would need breaking up to make more plant food available, and to allow of sowing the crop, and for the former process some implement, such as the hoe or plough, would be required.

Seed would need to be saved from the previous

year in sufficient abundance not only to provide for the next sowing but also as a reserve of the tribal food till the next harvest.

But if the harvest is to be enjoyed, a certain amount of security is necessary. The pressure of neighbouring hostile or war-like tribes would make agriculture a very uncertain undertaking, and this, together with the fixity of abode required for its successful practice, would render its adoption unlikely except where its value had already been proved.

These difficulties confronting primitive man in venturing upon agriculture, or in maintaining it afterwards, are so great, that it could only have arisen and developed in a very favoured area. Moreover, it could have been extended only by a people having a relatively fixed abode ; and the greater the dependence on food-production the more fixed the abode. But this fixity would produce increasing supplies, and the leisure arising from an assured supply of food would foster the invention of implements of husbandry—and so civilization would emerge from the primitive community. Increasing food supplies would tend to increase population ; and then, as this growing population pressed upon the means of subsistence, new inventions would be made to cope with the increasing demand for food. At length there would appear an agricultural genius, who, envisaging future needs, would plan, as the great Kings of Egypt

and Babylonia did, vast and comprehensive schemes for bringing large tracts of land under cultivation.

It has already been pointed out that agriculture was extremely unlikely to have arisen independently except in most favoured regions ; while even to-day it is not universal among the peoples of the earth. We must examine the great historic nations of the Old World to see whether they have *always* been cultivators of the soil, for we shall see later that agriculture was the cause of their greatness.

Greece and Rome were among the earliest nations to become highly civilized ; and our debt to Grecian literature, science, and art, and to Roman law and government is universally acknowledged.

Roman civilization begins about 700 B.C. and Grecian three or four centuries earlier, but we have in the last thirty years learnt from the story of primitive man in Europe that nearly one thousand years before Grecian literature begins, men were cultivating crops (mainly cereals like barley and wheat) in what is now Switzerland and North Italy.

This date is probably somewhat later than 2000 B.C. Though it is erroneous to suppose that primitive man in Europe had not in the second millennium B.C. learnt the use of metals, yet his implements of husbandry were of wood, bone, or stone ; and some of these non-metal implements persisted in Europe till they became figured on earthenware or were mentioned in the poets.

The great nations of Asia which still persist, India and China, can trace their recorded history further back than Rome, possibly two or three centuries farther. Both these nations have throughout their history been mainly agricultural, as they still are, and it might be thought that in them we have the beginnings of the great art of cultivation. But the traditions of both nations show that the art was borrowed by them; and so the source of agriculture must be sought further back.

There remain two nations of even greater recorded antiquity than India and China, and both of these depend on the cultivation of the soil for their rise, progress, and continuance. The claims of Mesopotamia, or, as we shall term it, Babylonia, and Egypt, must therefore be examined.

CHAPTER II

WHICH CIVILIZATION WAS EARLIEST?

SINCE AGRICULTURE can develop only with a civilized state, the question arises, where did man first begin to grow crops? and what did he first grow? Recent research has shown that both in Babylonia and in Egypt barley and wheat were cultivated in early times, and that in each case

barley preceded wheat. It might, therefore, on the one hand, be presumed that both Babylonia and Egypt independently discovered the art of cultivation, or alternatively that one learnt from the other. Which of these suppositions is the sounder?

Barley grows wild in Mesopotamia, Syria, and Palestine. It also grows wild in North Africa, Cyrenaica (to the west of the Nile delta), and in Abyssinia, so that it grew in the rift of the Nile Basin. So far, then, the evidence is balanced between Egypt and Babylonia, for barley, the earliest crop known to these ancient nations, grows wild in both lands.

There are, however, other factors which make probable the priority of Egypt. These are so numerous that they will be discussed in turn.

First let us consider the *natural conditions*. Turning to the map of the world, we shall find in that section between 30° and 50° E. of Greenwich and 20° N. to 40° N. the oldest civilizations known: those lying in the Nile valley and the Tigris-Euphrates trough. The country lying in the latter trough was known by several names. The greater portion was Mesopotamia, i.e. the land in the middle of the rivers; that part nearest the delta and Persian Gulf was known as Chaldea; further north it was Babylonia; and still further upstream, Assyria; but for convenience the whole of the area between the rivers will be called Babylonia; and Egypt, 'the gift of the Nile,'

as Herodotus termed it, will be used to signify the whole of the Nile valley from the first cataract to the mouth.

In our country and nearly all over Europe, crops depend on the annual rainfall; and the same is true of the vast tracts in Canada, the United States, and Argentine. But both Egypt and Babylonia are practically rainless lands, and so the cultivation practised in each case was dependent on irrigation. (It may be pointed out that the other two great Eastern civilizations, China and India, had similar systems.) The water supply comes from the overflowing of the rivers, and this overflow is partly or entirely manipulated by man for his own purposes. As this overflowing or inundation of the surrounding lands is fairly regular, occurring almost always about the same time of the year, arrangements can be made to regulate or store the supply when once man has learnt the art of cultivation. Until controlled, the inundation might easily be disastrous; and unless it came at the right time, it would be useless.

In Egypt, the Nile flood begins in July (usually about the 19th to 21st), and increases in volume till mid-October, when the river resumes its channel. The evaporation during the winter season is small, and the ground is moist enough for the complete growth of millet, barley, and wheat. These ripen by March, April, or the beginning of May, and the harvest is gathered before the next inundation begins.

In Babylonia, the conditions are very different. There the inundation comes in May; the rivers are within their banks again by June; and evaporation is so rapid that by July the ground is parched like a desert. It is obvious that one single and prolonged saturation of the soil would not suffice as in Egypt, but that frequent waterings would be necessary to save immature crops from being scorched. Such practices would demand control of the inundation—a feat of engineering which only a fairly high civilization, and a centralized one at that, could achieve.

So, since man had only to copy the lesson which Nature was showing him year after year, Egypt might accidentally discover how to grow crops owing to the suitable time of the inundation, an object lesson that did not exist in Babylonia.

The Nile flood is quite moderate compared with that of the Tigris, and the silt which it brings down is in quantity only one-fifth that of its rival. It is clear, therefore, that when man first determined to control the floods it would be a much easier task in Egypt than in Babylonia.

The silt of the Nile being finer would contain few large stones or heavy lumps of earth, and would therefore be not only lighter to work than the newly formed deposit in the Tigris-Euphrates trough, but would reduce to a minimum the danger of a cultivable tract being blotted out by rubble deposit. There is one further marked advantage

which the Nile silt has over its rival: it is much less alkaline, and so more congenial to the crops.

Historical and other considerations. Quite recently the decipherment of certain cuneiform inscriptions has fixed within very close limits the date of the first Babylonian Dynasty. It falls between 2900 and 3100 B.C., and similar research has shown that the first Egyptian Dynasty is 3300 B.C. or earlier. This gives Egypt at least three to four centuries of precedence, to which must be added the important fact that for several hundreds of years before the 1st Dynasty Egypt, unlike Babylonia, can show a settled and continuous civilization. Babylonia was open to the pressure of hostile peoples from the east and the north, and her early history was unsettled and precarious. Egypt, on the other hand, shut in by the desert east and west, by the marshy delta seawards and the cataracts upstream, had abundance of time to develop her natural resources during early, middle, and late pre-dynastic times.

Some twenty-five years ago Prof. G. Elliot Smith examined certain bodies which, buried in the hot dry sand, had been naturally preserved; and from the intestines he recovered the last meal before death. These gut-contents were examined by the specialist Prof. F. Netolitzky and his colleague Frau Gherasim of Vienna, who found that in nearly every body husks of barley were present, while in about 10 per cent of them millet was found. In no instance was there any wheat. The bodies

containing the barley and millet were of the early pre-dynastic periods, and the inference is that these crops were raised in Egypt over six thousand years ago.

That some crops of cereals were grown very early in Egyptian history is further shown by the abundance of flint sickles found in several parts of Egypt, and of stone querns for pulverizing the seeds. As stone sickles are most likely to have been effective against thin hollow stems like those of barley and millet, their existence (taken with the discovery of barley and millet in the early pre-dynastic bodies) would seem proof enough of the existence of Egyptian agriculture long before the recorded history of Egypt begins. The case for the supposition that agriculture originated in Egypt is therefore based on these preliminary considerations: the extremely favourable conditions of climate, soil, silt free from large stones, the slight amount of alkalinity in the silt, slope of the land, the suitable time of the flood, and the historic-geographical factors. To this evidence must be added the confirmation of local tradition.

The Babylonian tradition tells us that Ea or Oannes, a fish-man, rose from the sea of the Persian Gulf, dwelt among men and taught them letters and arts and sciences. He showed men how to build cities and temples and taught the uses of seeds and fruits.

Tradition, that is to say, indicates that Babylonian

agriculture was borrowed. We also know that the earliest Asiatic text dealing with agriculture is Akkadian, that is, pre-Babylonian (see pp. 80–85), and that Babylonia never had a specific god of agriculture. The Egyptian story is quite different. Its tradition, unlike that of other lands, was, according to Diodorus Siculus, of a king (or god) named Osiris who was Egyptian-born and discovered agriculture.

Osiris not only taught the Egyptians agriculture, but he travelled in various parts of the world spreading knowledge of the art among mankind. He is also 'said to be the first to gather fruit from the trees and to train the vine to poles and to tread the grapes. . . . Eager to communicate these beneficent discoveries, he committed the whole government of Egypt to his wife Isis and travelled over the world diffusing the blessings of civilization and agriculture wherever he went.'

In countries where the climate or the soil prevented the culture of the vine, Osiris taught the peoples how to brew beer from barley; and then, returning to Egypt loaded with gifts of gratitude, he was hailed and worshipped as a god. His wife Isis it was who first found barley growing on the banks of the Nile, and showed man how to distinguish it from other wild weeds and how to cultivate it. It is worth while noting here that the tradition makes Isis the actual discoverer of agriculture, and points to the possibility that at some early date

a woman collecting seeds first noticed the sequence of seeding, germination, growth, and further seeding; and so was inspired to turn from collection to production.

These traditions of Egypt's discovery and dissemination of agriculture fit in perfectly with the Babylonian story of borrowed knowledge, for we have evidence that Egyptian traders, already trading by barter, preceded historical record by many centuries.

This Egyptian origin of agriculture will be further corroborated when we come to deal with the calendar, agricultural implements, and the Kingship.

CHAPTER III

ANCIENT IRRIGATION

O thou River who didst bring forth all things,
When the great Gods dug thee out
They set prosperity upon thy banks.

SUMERIAN SONG

IN MOST European countries the annual rainfall is sufficient to meet the farmer's requirements; but where this rainfall is inadequate, it is usually supplemented by irrigation, i.e. the artificial watering of land under cultivation. In many tropical lands the rainfall is so small, or so untimely, that

man is forced to direct or modify natural resources.

In Egypt the annual overflow of the Nile between August and October submerges wide areas. Owing to the gentle and fairly regular slope to the sea, the surface of the land emerges from the flood covered by a fine silt of rich mud ; and the natural drainage leaves hardly any pools or stagnant marshes. This drenching of the earth for a period of six weeks to two months is followed by the mild Egyptian winter which makes evaporation very slow. Thus the soil is kept moist during practically the whole of the growing season.

Millet, barley, wheat, and flax can be brought to maturity without further water supplies ; and owing to this natural irrigation of the soil millet and barley could in the earliest times easily be grown. For the soft light soil could, with primitive implements and little labour, be worked and freed from the small stone debris washed down. When the millet and barley crop resulted in increase of population, the supplies of food available became inadequate, so that fresh land had to be enclosed ; and the cultivators would then begin to interfere with the natural irrigation of the Nile valley by means of banks, dykes, and artificial canals.

Concerted action therefore became necessary either to build the new dyke, clear the canal, reclaim fresh land from the desert, or to make the important decision as to the time for cutting the

dykes holding the flood, so that it could water the low-lying levels without drowning them. Such a decision could not dispense with some form of central authority, suitably vested in the Kingship ; which, if it already existed, would receive an enhancement of its powers.

The need for this central authority would evidently become more and more urgent as the practice of dyke-cutting extended, for inopportune opening of the bank or dam might drain the higher lands before adequate saturation, or sweep away a bank lower down and swamp the crop. The close association in Egypt of the King with agriculture (a feature which will be considered in a later chapter) grew out of the necessity for centralizing dyke-control throughout the land, perhaps the earliest example of nationalization of an essential public service.

The form of irrigation which grew up in Egypt and which has now existed there for over 6000 years is called *basin irrigation*. Wide areas of from 30,000 to 40,000 acres are embanked so as to be flooded, and the waters are kept on the soil for six weeks to saturate it. Then the bank is cut, and the surface water still remaining drains down to a lower level and finally returns to the Nile or into the sea by a series of canals.

Another type of irrigation is called *perennial irrigation*. Under this system the water is allowed on to the land only a few inches deep at a time,

as in ancient Babylonia, and fields may be as small as three or even two acres. The surplus flood was husbanded to permit of several waterings as they became necessary.

Since the Tigris-Euphrates flood came in April-May and the water was within the river banks by June, the Babylonians had to take measures against the effects of the hot summer in order to save their plants from dying. Hence in Babylonia a different system was adopted from that of Egypt.

One of our greatest irrigation engineers, Sir W. Willcocks, is however of opinion that the primitive irrigation of Mesopotamia was basin irrigation. If this were so, it must surely have been copied from the Egyptians who invented it much earlier. No flood is more impetuous than that of the Tigris, so that, once basin irrigation was introduced, enormous banks would be necessary to withstand its rush, and indeed on more than one occasion the Tigris has burst its right bank and wiped out a whole countryside ; while a whole year's historical record was sometimes the single fact that the Tigris had burst its right bank.

The Euphrates was more easily tamed, but the conditions of the land watered by the Tigris necessitated a change in the size of the areas to be watered. The longer the banks, the greater the likelihood of a breach ; so that the advantage of making the change would be immense. For in the hot summer of Babylonia, crops can be sown,

matured, and gathered in three or four months. This produced two crops a year instead of the Egyptian one ; and so perennial irrigation became the distinguishing feature of Babylonian tillage.

There is, however, an important drawback to perennial irrigation, and that is the tendency for the soil to become over-alkaline and so reduce the yield, at first perceptibly, and later enormously. Even modern irrigators do not know how to meet this difficulty adequately ; and in modern Egypt, where the older system of basin irrigation has been partially replaced by perennial, the problem is becoming acute. A further difficulty is that as the smaller areas check the flow materially, more and more silt is deposited and the channel becomes clogged. It was one of the merits of the older Egyptian system that the annual flushing by the new Nile flood helped to remove this alkalinity, and there was the added advantage that the freer flow was not so liable to reduce the size of the channel.

Sir William Willcocks, with his lifelong experience of Egyptian and Mesopotamian irrigation, has well expressed this danger of modern times :

'Now, however, that perennial irrigation is gradually supplanting basin irrigation and weirs and obstructions are multiplying on the Nile, we are imitating the ancient Chaldeans on the Tigris and Euphrates, and we must beware of letting the channel of the Nile dwindle away in any respect.

If we carelessly neglect these precautions we have only to turn to the deltas of the Tigris and Euphrates to learn what injudicious perennial irrigation can do to ruin a country whose formation is deltaic, and therefore capable of being ruined.' (*Egyptian Irrigation*, p. 21.)

The same writer in a paper on "Egypt Fifty Years Hence," written in 1903, shows a further factor essential for a system of perennial irrigation —the need for peace and freedom from interruption:

'The system of irrigation introduced by the ancient Egyptians was entirely in keeping with ancient structures of the type of the Pyramids. It could defy time, even defy neglect. It was on this account that it survived every revolution and every trouble of many thousand years, while its rival, the perennial irrigation of the Euphrates valley fell utterly into ruin and decay. . . . Perennial irrigation is no hardy plant like basin irrigation, it needs perpetual and constant attention.'

Perennial irrigation was not, however, unknown on the Nile banks, for 'from time immemorial the Fayum province enjoyed a small amount of perennial irrigation from the seepage water entering the Yusufi Canal.' (*Egyptian Irrigation*, p. 389.)

Sir Hanbury Brown goes even further and asserts that:

'It is by no means improbable that the extreme north of the delta enjoyed perennial irrigation in

Ptolemaic and Roman times, and had enjoyed it *possibly for centuries before Hammurabi dug his grand canal of Babylon.* For 2000 years ago there was still in working order a remarkable natural reservoir in connection with the Nile known as Lake Moeris. According to Herodotus, who visited the lake about 454 B.C., the Nile flowed into it half the year and flowed back into the river the other half. Strabo and Diodorus Siculus both state that the reservoir was still in action nearly 500 years later.

'Somehow and at some time since then Lake Moeris disappeared, but the cultivated lands of the modern province of the Fayum have been identified as the bed of the ancient lake, and the low-lying Lake Kurun as the persistent rudiment of the reservoir.

'The existence of such a reservoir as Herodotus described would, it is reasonable to suppose, have created conditions of flow in the deltaic branches of the river favourable to the working of a system of perennial irrigation in the low lands of the North, bordering on the Mediterranean, provided only that the land-level had been in those days higher than it is now, with reference to the sea-level, and *convincing evidence exists that it was so.* There is also evidence to show that this land, now a barren plain, was cultivated in the past and was densely populated.' (H. Brown, *Irrigation*, p. 29: and *The Fayum and Lake Moeris*, pp. 19–61.)

Lake Moeris was one of the wonders of the

ancient world. It lay in a natural depression of the Fayum, and the Yusufi Canal (which some suggest was named after the Biblical Joseph) led the surplus waters of the inundation into this depression, and formed a lake which thus acted as an escape. When the Nile flood had sufficiently subsided, a canal lower down the river released the waters which could then be utilized for irrigation, before they flowed back to the main stream of the Nile.

Similar escapes were needed in the Tigris-Euphrates trough, and in the northern part one such reservoir, known to-day as Habbania, covered an area of 150 square miles and in flood was in places 25 feet deep. The southern depression, now called Abu-Dibis, covered 475 square miles (roughly twice the size of the area of Greater London), and was 20 feet deep to the sill where the water would flow back to the Euphrates at Kerbela. These two escapes also served the further purpose of feeding the river in times of low supply. Numerous and capacious canals with massive dykes supplemented these immense reservoirs.

In very early times, Egypt also enjoyed, to a slight extent, a form of perennial irrigation at Memphis and Abydos, which sites, having a soil capable of much absorption and retention of water, produced more than one crop a year. The early rise and subsequent importance of the two cities were no doubt due to these special advantages.

The third type of cultivation, i.e. in *terraces*, for which Babylon became famous in its later history, was also known in ancient Egypt; and at Darfur in the Soudan evidence of this mode of cultivation still exists. It is obvious that the Nile slope, draining area after area down to the sea, is itself a system of terrace cultivation where the terraces are large areas and the fall relatively slight. The genius of the people which dyked and canalized first the left bank of the Nile, and then (in the 12th Dynasty) took the right bank into its system of canals and dykes, could not well miss the possibilities of terrace cultivation where a hill-side could be utilized.

The citizens of Babylon developed this form of cultivation to a high degree of perfection. Their hanging-gardens were a form of terrace cultivation whose fame still stirs our imagination. They lay to the east of the city and sloped towards the river, forming a square of about four acres and rising to a height of 75 feet. A reservoir at the top drew the water from the river by means of a screw; and in its downward flow the water irrigated the gardens. On the terraces were found banqueting-rooms and fountains, and the eye was delighted by groves of graceful trees and luxuriant beds of flowers; while from the top of the gardens could be seen magnificent views of the city and its neighbourhood.

In the Andes of Peru, terrace cultivation attained

a similar perfection. There the walls that held the soil from washing down climbed the mountains to a height of several thousand feet.

It is worth noting that all the oldest civilizations —Egypt, Babylonia, China, India, and Peru—have had irrigation systems; and it is significant that in all these countries the first crops cultivated were cereals—barley and wheat in the Old World, and maize in the New. It may be observed in passing that we need not go far afield to see survivals of the ancient terrace system, for the slopes of our English downs in places are lavishly terraced.

Two quotations from Sir William Willcocks may fitly close this chapter, as they summarize the *natural* agricultural advantages of the Nile and the natural disadvantages of the Tigris-Euphrates.

'Of all the rivers of the World the Nile is the most gentlemanly. It gives ample warning of its rise and fall; it is never abrupt; carries enough of sediment to enrich the land without choking the canals; is itself free from salt; has its annual flood in August, September, and October, securing both summer and winter crops; traverses a valley with a climate mild enough to allow Egyptian clover in winter and Egyptian cotton in summer; and flows between limestone and sandstone hills which provide an abundance of building materials.

'The height of misgovernment which Egypt knew from the time of the Arab invasion in the latter half of the seventh century to the accession

of Mohammed Ali in the beginning of the nineteenth reduced the population from 12,000,000 to 2,000,000, and halved its cultivated area; but it could not destroy the extraordinary richness of what is rightly called the "Garden of the Lord," the land of Egypt. The same misgovernment turned the Euphrates delta into a wilderness, a marsh dotted with oases of cultivation.

'The Tigris and Euphrates rise without warning, are always abrupt; carry five times the sediment of the Nile; have their annual flood in March, April, and May—too late for the winter and too early for the summer—traverse a country where the temperature rises to 120° in summer and falls to 20° in winter—have a considerable quantity of salt in solution, and flow between degraded deserts of gypsum and salted marl.' (*Irrigation of Mesopotamia*, Intro., pp. xi–xii.)

With factors so adverse to cultivation and the added difficulty of disastrous inundations, it is in the last degree unlikely that agriculture originated in Mesopotamia.

CHAPTER IV

THE CEREALS

> Now when Jacob saw that there was corn in Egypt, Jacob said unto his sons, why do you look one upon another. And he said, Behold I have heard that there is corn in Egypt: get you down thither and buy corn from thence that we may live and not die. And Joseph's ten brethren went down to buy corn in Egypt.—*Genesis*, XLII, 1–3.

OUR WORD *cereal* enshrines the story of the Roman goddess Ceres, on whose favour depended the harvest of wheat and barley. From the 12th to the 18th of April was celebrated the return to upper earth of Proserpine, daughter of Ceres. Throughout the land the people marched in procession round their fields invoking the aid of the goddess for their crops, and to her temples worshippers clothed in white brought incense and honey and cakes of barley and wheat.

In August, festivals of thanksgiving were held, at which the first-fruits of the harvest were offered to the goddess. The ceremony was performed by women alone, wearing the white garments of the spring, and having fasted for nine days before it. These first-fruit offerings were called *cerealia*, so that barley and wheat came to be called 'cerealia,' from which is derived our word cereals. The term was afterwards extended to other grass seeds, such as rye, oats, rice, maize, and these four we now

proceed briefly to describe—the consideration of barley and wheat being deferred to a later part of this chapter.

Rye will grow on very poor soil, or in climates too hot or too dry for the other cereals to thrive. It is found over the greater part of northern Europe and Asia, where it forms the staple bread-stuff, and indeed the main sustenance of the poor peasants. In a double sense it is the 'grain of poverty,' and without it large tracts of northern Europe and Asia could hardly have been populated. It was unknown to the ancients even in Biblical times, and was incorrectly mentioned in the Authorized Version (Exodus IX, 32), but the Revised Version gives the correct term, *spelt*, i.e. emmer, or wheat. It was first cultivated in Russia, whence its use spread over northern Europe and Siberia.

Oats, which Englishmen usually associate with oatmeal, oatcake, and the hardy Scot, will thrive in cold mountain-valleys, or in marshy ground; and it shares with barley the pride of growing farthest north in Europe. Oats are grown more commonly in Scotland than in England, and Dr Johnson's famous definition of oats in his great dictionary—'the food which they give to the people in Scotland, and to the horses in England'—shows that a similar state of relative cultivation existed in his time. *Oats* contain more flesh-forming material and more fat than wheat; indeed more fat than any other cereal. Oats grow best in

cold climates, and their cultivation first began in middle and northern Europe. This was long after the introduction of wheat, but before the civilization of Europe was established. Oats were not cultivated in ancient Egypt, or Babylonia, or Judea. Their home, that is the place of origin of its wild ancestor, was most probably central or eastern Europe, and it probably also extended to western Asia.

Rice, the grain of the Far East, is the least nutritious of the cereals, and whenever wheat is very plentiful in the U.S.A. or Canada, and consequently very cheap, the people of India and China buy it to supplement or to replace their usual rice-food. Yet rice needs more labour and care in cultivation than the other cereals, and this circumstance, together with its inferiority in nutritive value, makes one wonder how it maintains its position as a food of so many millions.

But rice is essentially the grain of hot and moist climates, and so it forms the chief food of the teeming populations of India, China, Japan, and the East Indies. It is found elsewhere in the humid regions of the tropics; but in the drier parts of India it is replaced by the more productive millet. Rice, which originated in south-eastern Asia, reached China some centuries after the introduction of barley.

Maize, or indian corn, which is a highland plant like wheat, forms much the largest crop of the two Americas. In U.S.A. the maize crop is greater

than the sum of all the other cereals together. Twenty-five years ago the U.S.A. crop of maize exceeded that of all the rest of the world. From its original home in tropical America maize has been introduced into southern Europe, where it has thriven wonderfully. It is also grown in southern England and before it is ripe is cut and fed to the cattle. We know maize as human food in England in the form of corn-flour and hominy: but in America and southern Europe the ears of green juicy grain are cooked with a little sugar and eaten as a sweet.

In every known instance civilization has been associated with the cereals; why are they superior to other plants? Examination shows them to have a combination of qualities possessed by no other plant. Perhaps the most notable is that cereals make a very generous and prompt return for man's care; even in their wild state their yield is large, and this is enormously increased by cultivation. A field of wheat shows how close the ears can grow together, and by thus excluding the light and air from weeds, can secure for the growing crop the full food-supply in the soil.

Moreover the rapidity with which the cereals grow makes the harvest more secure. In Lapland, barley is harvested six weeks after planting; while in Spain, two harvests are obtained in a year.

The cereals, with the exception of rice, can also withstand the extremes of hot and cold weather.

This adaptability to a wide geographical range enables man to carry them with him in his migrations; while the separation of grain from the stalk is a simpler matter than digging roots, or hand-picking the pods of peas or beans, or freeing the kernels of nuts from their shells.

Cereals, again, contain much nutriment in small space. In this respect they are almost without rival in the vegetable world. Thus the amount of space required for storing, as well as the labour of carriage, is less than would be needed for any other food.

In addition to these useful qualities, there is the added advantage that the dryness of the grains and the practical absence of oil from them make the storage of the cereals easier than that of any other food. Every one knows that nuts kept over a season have an oily or fusty taste; and softer seeds or fruits tend to go rancid or rotten. Grains, on the other hand, may be kept for years without losing much of their food value—witness the story of the seven years' famine in Egypt.

Now other plants possess one or two of these qualities, in even greater degree than the cereals, but none possess the combination of them which makes the cereals so singular and valuable. The early importance of corn in the civilization of man can thus scarcely be overrated, whether this corn be barley, wheat, or maize (which is everywhere in U.S.A. called 'corn').

The unusual capacity of the cereals to reproduce themselves, combined with their ability to endure wide limits of climatic range, has made their geographical spread an easy task. And when we compare the very limited area in which wild wheat is found, and see how its cultivated descendants stretch to the Pacific across Asia, and to the Atlantic across Europe, and then across both Americas from east to west, it is not difficult to understand how the cultivation of the cereals has been co-extensive with the wide spread of civilization.

At the agricultural station of Tulare County, in California, recent experiments on barley, wheat, oats, and maize have shown that *barley* needed the least amount of water, that it matured sooner, and that it was able to persist in alkaline soils where the other cereals could not survive.

Now all these three qualities of barley are important; for in what are practically rainless regions, dependent on river-inundation for their water supply, that wild plant would best survive and spread which could do with the least or most irregular water supply. Its early maturity would again have survival value, for its seeds would be set and scattered and ready to propagate while its rivals were yet unready. And its greater power of tolerating alkali in the soil would enable it to spread where other cereals would fail to establish themselves.

We should therefore expect, where barley and wheat are concerned, to find wild barley the more

widely distributed; and this is so. Wild wheat is confined to a very small tract of south-west Asia, viz. Syria, Palestine, and Mesopotamia. Aaronsohn, a Palestinian botanist, found that wild wheat in Syria and Palestine was always accompanied by wild barley; but that wild barley was sometimes found alone. Wild barley is also found in Abyssinia, north-east Africa (Cyrenaica), and the Nile valley; and here undoubtedly it was first cultivated in the history of man. Then the knowledge of its cultivation spread to Chaldea, and later to Babylonia and Palestine. Once cultivation of barley began in Palestine or Babylonia, it would not be long before wheat was cultivated, for the wild wheat of Palestine is as large as modern cultivated wheat and actually heavier. And once its superiority as a bread-stuff in its wild state was established (and it is more palatable and more easily digested than barley), the rest would follow in due course. It is easy now to understand why seven centuries at least separate the cultivation of barley and wheat in Egypt, for Egypt did not possess the superior cereal in its wild state. It had to be found elsewhere, but once discovered in an adjoining land with which trading or colonial relations had been established, its introduction into Egypt would soon follow. For Egypt habitually naturalized plants and trees from many parts of Asia to make good her own deficiency; at a very early date (probably before recorded history) she had already naturalized the vine and

the olive, just as in later times she acquired many fruit trees, such as the peach and the cherry.

The *wheat* first cultivated in Egypt was emmer (*Triticum dicoccum*) which is an Asiatic plant. It had a serious disadvantage compared with the modern wheat (*T. vulgare*), in that the husk or shell is not easily separated from the kernel until it is partly roasted. When this superior modern wheat was discovered, it was cultivated to the gradual exclusion of emmer, though the struggle had not ceased in Egypt when Antony wooed Cleopatra.

The history of this double struggle between the first cultivated cereal (barley) and emmer, and then between emmer and modern wheat, is revealed in *The Ancient Records of Egypt* (J. H. Breasted). In the first volume, two appear, barley and emmer. In the third volume, references occur to heaps of emmer and barley as gifts to the Temples; and it will be noted that barley now takes second place. Wheat as distinguished from emmer is not mentioned till the fourth volume, where it occurs on seven occasions; and mention, too, is made of wheat in heaps. When wheat is last referred to it precedes emmer, while there is no reference whatever to barley. This chronological record is an excellent indication of the supersession of barley by emmer, and then of emmer by the superior and later bread grain; and this record shows the ancient Egyptians as pioneers in most of the arts required for a civilized life.

The quotation from Genesis which heads this chapter, and the repetition in three successive verses of the phrase 'corn in Egypt' which is now proverbial, show what a stable position in the world's economy Egypt had so early established. It is all the more remarkable that the people of Palestine should in time of famine look to Egypt for supplies, since, as we have seen, corn (emmer most likely) was probably introduced into Egypt from Palestine, which Aaronsohn claimed to be the 'cradle of the cereals,' when he proved that the wild wheat of Palestine and Syria was an ancestor of modern wheat.

Modern botanists who have tested this claim, O. F. Cook of the United States Agricultural Bureau, and Prof. Percival of Reading University, England, have confirmed it to the extent that the Palestine (and Syrian) emmer is a true wheat, and is most probably an ancestor of modern wheat. *Triticum* is the botanical Latin name for the wheat group. When the ear is broken into its component spikelets, it is found that the spikelet may contain two grains (*dicoccum*), or only one grain (*monococcum*). In their wild state both *T. dicoccum* and *T. monococcum* occur in Palestine and Syria, where Aaronsohn discovered them and also forms intermediate to them. It is probable that modern wheat (*T. vulgare*) sprang from one of these intermediate forms. The cultivated form of *T. monococcum* is known as lesser spelt or einkorn; and

the cultivated form of *T. dicoccum* is known as emmer. They are still grown in parts of southern Europe.

CHAPTER V

ANCIENT AGRICULTURAL IMPLEMENTS

DURING THE period when man was merely a food-gatherer, the only implement he required for picking his roots and stems from the ground

FIG. 1
AUSTRALIAN DIGGING STICK

FIG. 2
SWEDISH HACK

was a stout stick pointed at the end. Such a tool (Fig. 1) is still employed by the Australian aborigines

and also among certain hill-tribes of India, who harden the point by fire.

But when man becomes a cultivator, he must prepare the soil, and for this purpose the digging-stick would not suffice. Sir Gardner Wilkinson thinks that in Egypt a small tree stripped of leaves and dragged over the surface was the first means used to break the soil. If this were so, it is obvious that the smaller branches would soon break off and only the stronger ones be left. Even then some branches would be in the air while others were breaking the surface; and before long some thoughtful husbandman would cut away all the useless branches. Since such a cumbersome implement required so much effort on the part of the operator, he would ultimately simplify it by keeping only one, the most effective branch. This main stem and branch was the progenitor of the Egyptian hoe and the Swedish hack.

Swedish tradition gives us the steps in the evolution of the implements of its husbandry. First there was the hack (Fig. 2), which was merely a stout piece of spruce fir with a short and pointed bough sticking out at one end.

The hack was then made heavier and dragged by men through the soil roughly in the manner of a plough. Later the instrument was made in two pieces, with a handle for the man directing the plough and a pole for his partner to drag. Then the share or stock was shod with an iron point, and

eventually a pair of animals replaced the man or men who dragged.

'This seems nearly the way in which *thousands of years earlier* the hoe first passed into the plough,' says E. B. Tylor. The illustration leading him to this conclusion (Fig. 3) is shown below; and it is more than likely that the Swedish tradition was only borrowed from Egypt. For in Egypt we are not dependent on tradition: the actual implements have been found and specimens are shown in

Fig. 3
Egyptian Hoe and Plough

several European museums, while representations of them are to be seen in sculptures and drawings. Their evolution can be traced step by step. There is, for example, considerable evidence about the hoe. It is the hieroglyph for agriculture. It was used not only in the fields from pre-dynastic times, but in the 1st Dynasty it was commonly employed in the manner of a pick to make embankments or to raze structures. When a king of ancient Egypt decided to build a temple, he performed the rite of consecration by means of a wooden hoe whose dimensions were definitely

fixed ; and for 3000 years his successors used just such a hoe for ceremonial occasions.

On a fragment of a club which records this act of a priestly king, two peasants are shown near a palm tree (in the lower picture) breaking the soil by means of an implement identical with that which the monarch (in the upper picture) uses to consecrate the foundation of a building. In the Cairo Museum, a schist palette represents the king destroying, by means of a hoe, a strongly built

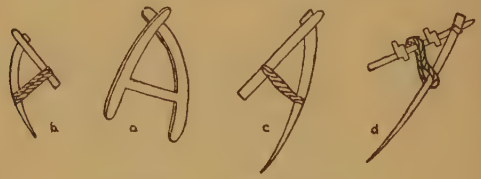


Fig. 4. Various Hoes

central fort taken from the enemy, and (according to the phrase of that time) 'passing the towns to the plough.'

Though metal hoes were familiar as early as the 5th Dynasty, the wooden hoe was retained down to the latest times for opening the earth at a burial, for the religious ceremony of laying foundation stones (the kings being shown carrying it in their hands), and for digging the four corners where the angles of a monument were to be set. (Fig. 4.)

The hoe in Fig. 3 can easily be seen in the plough which accompanies it ; and this very evolution is

shown in the Berlin Museum of Antiquities. In the same show-case are parts of a wooden plough, and a reconstructed model to show the plough as it probably existed. (Fig. 5.)

The axe is simply a hoe with the blade made from the flattened point (Fig. 6): while Figs. 7–14 show different varieties of ploughs, mostly with metal shares, but all exhibiting their relationship to the hoe. One (Fig. 14) seems to have a double

Fig. 5.
Egyptian Plough (Berlin Reconstruction)

share; but even this departure was anticipated in one hoe, which is figured with a double prong. (Fig. 15.)

The sickle and the harrow in Egypt both go back to pre-dynastic times. Certain figures of the dead have hoes or axes (Fig. 16) in their hands, while harrows hang by ropes from their shoulders. One such figure of later times has an implement which is almost exactly like a Swedish hack. (Fig. 16 b).

When first used, the sickle was probably the jawbone of an animal, ox, or sheep; and in the

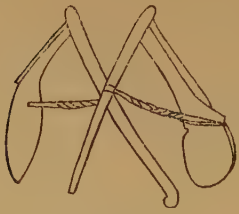


FIG. 6

FIG. 7

FIG. 8

FIG. 9

FIG. 10

FIG. 11

FIG. 12

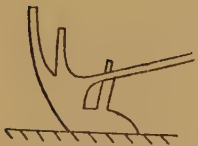


FIG. 13

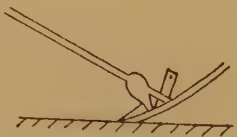


FIG. 14

FIG. 15

museum of University College, London, where the flint-manufactured sickle is placed beside the animal jaw, the likeness 'leaps to the eye.'

Even the wooden sickles which replaced the more laborious flint ones had the teeth shaped and sized like those of a herb-eating animal, and these teeth were fixed into the wooden frame with bitumen and Nile mud. The later iron sickles were notably

(*a*) Death-figure of early times with hoe, axe and harrow

FIG. 16

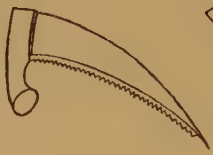
(*b*) Death-figure of later times with hoe and pick

different in shape from the earlier flint and wooden ones. (Fig. 17.)

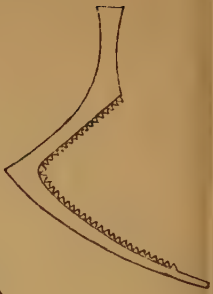
Fig. 18, a, b, c, d, shows the evolution which in Swedish story is merely tradition. These painted sculptures were found by a Frenchman attached to the Scientific Corps under Napoleon in Egypt. They are from a Theban tomb of the 18th or early 19th Dynasty.

When we compare Babylonian agriculture with Egyptian, we find there is a complete absence of actual implements, and even the representations of

1



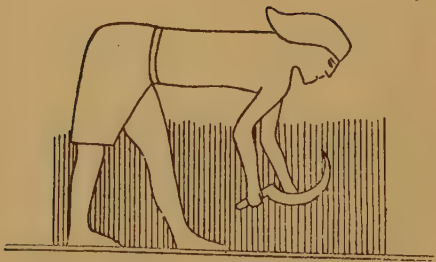
2



3

4

5



6

7

7*a*

7*b*

FIG. 17

(*a*) Hoeing the Ground

(*b*) Plough Drawn by Man

(*c*) Plough Drawn by Oxen

(*d*) Two-handled Plough

Fig. 18

(From a Theban tomb of the 18th or early 19th Dynasty)

them are very few, in striking contrast to the wealth of Egyptian drawings and sculptures. There is the further very important difference, that all the Babylonian ploughs are of a very advanced type, while much research has discovered only one representation of simpler implements, that of a hack and a saw.

Both the Chaldean plough and the Babylonian

CHALDAEAN FARMING OPERATIONS
(In all three ploughs, the tube between the handles is for drilling the seed)

plough (which is presumably later) possessed not only two handles, but a central tube-stem for drilling the seed ; and the Assyrian plough shows the same complexity.

Since we know that the plough in Egypt appeared definitely in the 3rd Dynasty, i.e. before 2900 B.C., the chances that Babylonia originated and brought to such complexity the ploughs referred to above are negligible. That agriculture began in Egypt

and spread to the Tigris-Euphrates trough is confirmed by all the lines of evidence which I have examined since the second chapter of this book.

The *shadoufs* in Egypt and Babylonia are so much alike that their common origin is undoubted. The shadouf consists of a bucket hanging by a rope from one end of a lever. At the other end is a heavy weight, a rock, or a lump of earth. The husbandman pulls down the bucket till it reaches the water and is filled, and then releases his hold, so that the weight at the other end raises the filled bucket.

Babylonian Plough

The water is then tipped into a hole or trough and is utilized at this higher level. Thus land above the flood-level can be watered and new land brought under cultivation.

The Persian water-wheel is a later development, and its name betrays its origin. One form of it is merely a number of shadouf buckets on an endless band which is worked by a cogwheel device pulled by an ox. The water is brought up exactly as a dredger brings sand or mud up in the Thames or Tyne, and the buckets empty their contents in a similar way. In the water-wheel, the water is

conducted along a trough, and then run into a reservoir to be used later on for irrigating.

One other instrument of agriculture was invented in Egypt, the Nilometer, which consisted of a stone well with one or more walls graduated in cubits and hands to register the maximum, mean, and minimum heights of the Nile floods. It had

SEED SPREADER

ASSYRIAN PLOUGH

free communication with the river. This system of measuring the flood was invented to determine when the dams were to be cut so that the water might be carried to the farthest lands under cultivation. The earliest Nilometer was probably at Roda, but that on Elephantine Island, opposite Aswan, is the oldest *existing* Nile-measurer, while the next oldest is at Roda Island, near Cairo.

When the flood reached 16 cubits at Roda, flood irrigation for two years' crops followed everywhere. If at flood time Roda registered only 12 cubits, there was grave danger of famine; and the contrary danger of disastrous flood arose when 18 cubits was registered; 14 cubits provided a meagre supply but would stave off famine.

Strabo (64 B.C.–A.D. 21), writing of the Nilometer at Elephantine, says:

'The Nilometer is a well upon the banks of the Nile constructed of close-fitting stones on which are marked the greatest, the least, and the mean risings of the Nile, for the water in the well rises and falls simultaneously with the waters of the Nile.

'Upon the walls of the well are lines which indicate the complete rise of the river and other degrees of rising . . . for it is known long before by these marks and by the time elapsed from the beginning what the future rise of the river will be, and notice of it is given. This information is of service to the husbandman, with reference to the distribution of water and for the purpose also of attending to embankments, canals, etc. . . . It is of use also to the governors who fix the revenue, for the greater the rise of the river, the greater it is expected will be the revenue.'

The Nilometers of Egypt are of great importance as their record, according to Capt. Lyons, extends back for 5000 years. Borchardt, who has made

a special study of this branch of Egyptology, confirms the antiquity of the Nilometer. There were Nilometers at several points ; and Greek and Roman writers state that 28 cubits at Elephantine, 21 at Koptos, and 7 in the Delta meant good and safe crops.

The Nilometer is an instrument peculiar to Egypt. No other nation of antiquity, so far as is known, either invented or used any instrument similar to the Nilometer, by which the harvest could be estimated in advance.

Together with the discovery of agriculture, the invention of geometry and of the solar calendar, and the perfection of the Pyramids, the Nilometer stands as an example of the marvellous ingenuity and resource which Egypt exhibited while the rest of the world yet lay mentally asleep.

CHAPTER VI

AGRICULTURE AND THE CALENDAR

THE CALENDAR* is such an integral part of civilized life that, like the air around us, we are scarcely conscious of its existence till it begins to fail us. Lovers and workers ; debtors and creditors ;

* For fuller consideration see another volume in this series, *New Year's Day*, by S. H. Hooke.

wholesaler and retailer; landlord and tenant; insurance company and insured; stay-at-home and globe-trotter; seamen and railwaymen: all must regulate their actions by the calendar if chaos is not to displace order. Nowadays even the amount of sunshine enjoyed is partly determined by the duration of 'summer time' which may be twenty-four or twenty-six weeks according to the calendar dates agreed on.

In such a complex civilization as ours, all trading countries must have the same calendar, even if, for religious or national reasons, they have an additional calendar of their own. But it is obvious that such a complicated device as the calendar year, with its leap-year day once in four (except at certain century ends), could not have arisen independently in different parts of the earth. Research shows that the calendar originated in Egypt with agriculture, or rather as an indispensable resultant of agriculture.

So long as man hunted and fished or collected food, no calendar would be necessary. The simple alternations of day and night would soon attract the attention of self-conscious man; and a certain North American tribe still measures the distance between two places by the number of 'darks,' while another reckons by the number of 'sleeps.'

Even primitive man would note the phases of the moon, as uninstructed children of to-day do; and when he had learnt to count to ten he would

notice the recurrence of the phases in about 30 days. Later he would find that 59 'darks' or 'sleeps' coincided with two lunar months.

Most peoples who never attained a high civilization, would get no further than the notion of a 'moon' or lunar month; and this would suffice for some forms of husbandry. In the northern hemisphere, speaking generally, the spring equinox marks the bursting forth of plants and trees; and seeds planted then would attain maturity before, or by, the autumnal equinox.

For example, in England small gardeners and allotment holders for many years have planted out their potatoes on Good Friday, which may vary between March 20th and April 23rd; and this period of nearly five weeks' variation does not seem to make any marked difference in the time of harvesting or the amount of the crop. This is because the rainfall, though variable both in time and quantity, averages up over six months.

Thus also we find that the spring equinox (March 21) has been the new year of many northern nations of antiquity, the Babylonians, Jews, Greeks, and Romans. But long before Rome had emerged from barbarism, another nation had been driven to adopt a yearly calendar which later formed the model on which the scientists of Julius Cæsar's time remodelled the Roman calendar. Egypt has no marked spring-time; but the Nile inundation occurs with a regularity which is paralleled by few

other phenomena on the earth's surface; and as soon as Egyptian agriculture had become organized, the adoption of a year would be imperative for the secure harvesting of their crops.

The earlier agriculturists of Egypt had a *lunar* calendar, for the term 'ebod,' applied to their season of four months, meant originally a month; and the hieroglyph for the month was a crescent moon. But the *solar* calendar comes early in their history; so early that it reaches right back to the beginning of the 1st Dynasty, and Menes or Mena is credited with its inauguration.

Not only is this the oldest calendar on record, but it has the unique quality of being the only solar calendar invented or adopted by a nation of antiquity. Indeed only one other nation—Rome—did adopt a solar calendar of 365 days, and the Roman was an avowed copy of the Egyptian.

The calendar used throughout the civilized world to-day is the Roman, and its month-names show the three stages of calendar evolution. The old Roman year began with *March*, a name derived from the god Mars, who, before he became a god of war, was the deity who ripened crops. At the end of the agricultural season (on October 15th) in ancient Rome a horse was sacrificed on the field of Mars to ensure the success of the next crop. The horse's head, after being separated from the body, was adorned with a string of loaves.

April is derived from the Latin *aperilis*, the

opening month, when plants and trees open their leaves.

May is named after *Maia*, the goddess of growth.

June is derived from *Juvenis*—youth (or younger).

September is the seventh month after March (*septem*—seven).

October is the eighth month after March (*octo*—eight).

November is the ninth month after March (*novem*—nine).

December is the tenth month after March (*decem*—ten).

These last four names exhibit the second stage, i.e. the arithmetical ordering of the months. The third stage is exemplified in January and February, for they were added by Numa Pompilius, a priest-king, and the names have theological meanings; while July (after Julius Cæsar) and August (after Augustus Cæsar) were originally the fifth and sixth months (Quinctilis and Sextilis).

Thus the Roman calendar just before the Christian era had six of the month-names arithmetical, four agricultural and two theological.

The Greek calendar shows in its month-names the secular interests and activities of a fishing, trading, and agricultural people.

The Babylonian calendars from early to later dates show a progression from a husbandman's calendar to a theological one. In the earliest Babylonian calendar six of the twelve month-names

refer to corn; and two of them are corn-eating months. They are separated by four months, and would roughly correspond to our April and August; and from this we gather that already, when this calendar was framed, Babylonia enjoyed perennial irrigation and the two crops per year which that system of irrigation allows. Later, the calendar shows only three clear references to agriculture, the god-festival month-names easily predominating. Later still, there appears a numerical month (the sixth month, during the Dynasty of Ur); and in Hammurabi's time there is evidence of the additional (thirteenth) month, bearing the same name as the twelfth with the symbol II added.

A striking feature confronts us when we examine the Egyptian month-names. From the earliest recorded times, the Egyptians have had two sets of month-names, one purely arithmetical, and the other purely theological; and there seems to be no connection with agriculture. The arithmetical names are I, II, III, IIII, of the Inundation, I, II, III, IIII, of the Sowing, or Growth of Vegetation, and I, II, III, IIII, of the Harvest. Here arithmetical evolution has been carried to its logical extreme.

The theological month-names were Mesore, Thoth, Paophi, Athyr, Choiak, Tybi, Mechir, Phamenoth, Pharmuthi, Pakhon, Payni, Epiphi. Only after long research did the agricultural connections of some of these month-names appear.

Take the month-names in which agricultural connections have been found :

Mesore=Mesut-Ra birth of Ré, the sun-god.

Tybi also bore the name Shefbodet which probably means the sprouting of the grain (barley) : and this would occur in March-April, with November as the opening month of the year. The god Tybi is shown with a sprouting ear of corn in his hand in the calendar sculptured in the Edfu temple.

Pharmuthi, the month in which the festival of the goddess Ermutet occurs. She was a snake-goddess, and her name means 'the lady of the granary.' On the first of this month she gave birth to the corn-god, Napri or Nepri, and on this day a great harvest festival was held throughout Egypt.

Epiphi according to some scholars is connected with the Semitic *abib*, which means ripe corn. There would be no ripe corn in Egypt in October, and a solution of this difficulty will be suggested later in the chapter.

Athyr is the month of Hat-hor, =house of Horus. Hat-hor is the cow-goddess or mother-goddess who through her son-lover is associated with irrigation, vegetation, etc.

Athyr is perhaps the most striking month of the calendar. Then were held some remarkable festivals which are unmistakable in their reference to agriculture. On the 18th–25th there was the festival of 'making and watering the barley-beds of Osiris.'

On the 22nd there was the festival of 'hacking up the earth.' On the 26th there was 'a Memphite festival connected with the Kingship and also with the resurrection of Osiris.' On the 30th there was 'the raising of the dad-column to celebrate Osiris's resurrection.'

Dr Alan Gardiner holds that these festivals celebrate 'the drama of the Kingship'; yet he agrees with Sir James Frazer that 'the dates of these festivals are dependent upon the great annual events of the agricultural calendar.' He goes on to say: 'that the rites of the laying of the Osiris beds of barley and of hacking up the earth occur in the midst of the Osiris festivals of the fourth month are facts the antiquity of which must be presumed, and the significance of which cannot be denied. Can it be mere coincidence that the death and burial of Osiris should be supposed to take place at the very moment when the season of inundation (Akhet or Shait) was drawing to a close, and that the accession of Horus should be fixed on the very first day of the season of spring (Piret)?'

At present there is some doubt as to when the Egyptian year began. Probably (as is suggested by the analogy of other calendars) it opened simultaneously with the beginning of field operations, and in that case the end of October or beginning of November would be the original New Year.

Egyptian life was essentially agricultural, and the calendar was originally that of a husbandman. It is

no surprise that 'in the annals at the bottom of every year space there is a separate space in which the measurement of that year's high Nile is given. . . . The arrival of the annual flood was evidently regarded as an event to be recorded at the end of each year; for not only was it written at the bottom of the yearly record, but in cases where the death of one King and the accession of the next necessitated the recording of one year's events in two parts, this Nile measurement was written at the end of the second part.' (A. C. Weigall, *A History of the Pharaohs*.)

This November New Year would fit in with the 'bursting of corn' in *Tybi* (March–April), and with the harvest-home universal throughout Egypt in *Pharmuthi* (June-July), when all the latest and main crops are garnered. The great 'barley bed' and 'hacking-the-ground' ceremonies of *Athyr* would take place in February-March; and the resurrection of the year and Osiris came near the spring equinox.

The month *Epiphi* ('Ripe corn') would fall in October and would therefore be discrepant with this arrangement, and one cannot associate *Mesore*, birth of Ré, with November.

It is probable that the Egyptians at some period of their early history did what the Babylonians and Jews did later, that is, they transferred the New Year from the true agricultural beginning to the end of the farmer's year. In Egypt, this would

be June-July, when the sun is at his hottest; and this would be the time for the birth of Ré, the sun-god. Then *Epiphi* would be the month of ripe corn. This change, which fits in with the first rising of the Nile, was probably made when the cult of sun-worship became ascendant at Heliopolis.

With sound logic the Egyptians made each month of 30 days, divided into three weeks of ten days each. The additional five, to make 365, were added at the end of *Epiphi*, i.e. at the end of the inundation, and so must have been already present when the solar year began in November.

The writer on the Egyptian calendar in the *Encyclopædia of Religion and Ethics*, pointing to the agricultural references in the Basuto month-names, states that, no matter how far back one goes, there is in the Egyptian calendar 'nothing resembling the agricultural references to germination, flowering, and ripening found in so many calendars, or to pastoral affairs as in the Basuto calendar'; and that in this respect the Egyptian differs from all other African calendars.

As against this judgment, however, our investigations show that, hidden behind the theological names, there are vital and significant connections with agriculture. The apparent absence of connections in the Egyptian month-names with agriculture is due to the immense antiquity of the calendar, which in the long and slow process of passing through the descriptive and arithmetic

stages lost its original agricultural significance. Finally it showed only the purely arithmetical side by side with the theological names. Thus the Egyptian calendar originated from agricultural needs, as most calendars have done; and, owing to its long evolution, the earliest names were entirely overlaid by a process which is common to all the older calendars and evident even in some of the later.

CHAPTER VII

AGRICULTURE AND THE KINGSHIP

SO LONG as agriculture is dependent, as in many climates, on a variable supply of rain, the calendar will be largely a list of 'Works and Days' as it was in Hesiod's time, and as it still is in some Eastern lands.

Ten month-names suffice where there is a long period of quiescence in winter; but, as winter activities become more organized, additional month-names fill up the gaps. Even then a luni-solar calendar suffices. Under special conditions, however, as in Egypt, where the onset of the inundation recurs each year at almost exactly the same hour, the need for a solar calendar arises; and, when this time can be associated with the rise of a particular

fixed star, great exactitude becomes possible. The control of the calendar passes into the hands of the king or priest because of its immense value to agriculture.

Rain-making priests and chiefs or kings whose prime function is to ensure fertile crops or other food-supply still exist in many parts of the world. At Ashantee, the King and then the royal household must first eat of the same yams before any other of the tribe may eat. In French Senegal, at Benin, among the caffres of Natal and Zululand, in Togoland, among the Matabele and in various other parts of Africa, similar magical powers were attributed to the chief who had originally blessed the crop, and who must take priority in eating the first-fruits. The sacrifice of first-fruits to gods in India illustrates the same belief in the magical power of kings; for the earthly king often becomes a god at death; and not infrequently he has a divine origin. Sometimes he is treated as a god even during his lifetime.

The history of ancient Egypt reveals the origin of what is practically a world-wide belief. It will be remembered that the ceremonies in the month of *Athyr* (Hat-hor) showed a close connection between 'the drama of the Kingship' and the celebration of agricultural ceremonies. This connection is fundamental. Sir Flinders Petrie affiliates the King of Egypt to the present African rain-maker, pointing out that at the ends of the lintels

in great temples, and occasionally elsewhere, there are sculptured figures of the King in a 'running attitude.' The three signs placed after the figure of the King are the hieroglyph for 'cultivated land,' and the running is for the magical purpose of producing plentiful crops.

Often standing before the King is a small female figure with the plant of Lower or of Upper Egypt on her head, and this figure invites the King to act—'Come and bring the inundation.' The King, endowed with all life, stability, power, and health, went 'three times round the field'; and he had 'protection of life behind him.' Thus the King went round the field ceremonially to drive away evil influences, fertilizing the land with the flail (originally a bull's tail: the bull was a symbol of fertility) and leaving blessings behind him.

On one of the mace heads from Hierakonpolis there is figured King Scorpion digging an irrigation runnel with his own hands. Other representations of the Pharaoh show him turning the soil with a hoe, opening an irrigation canal with a pick, or cutting the first ears with a sickle. To make the inundation occur at the proper time, Pharaoh casts his written commandment into the Nile and the obedient waters promptly rise. Another stele shows a Pharaoh of the 3rd Dynasty consulting the books of magic to conjure away pestilence and drought. So much for the sculptures.

It is, however, when the literature of Egypt is

examined that the most unmistakable evidence is derived of the connection of the King (Osiris) with agriculture:

'Hail, Osiris, I am thy son Horus
I come, giving homage to thee with vessels of water;
I come and plough for thee the fields,
I come to fill for thee the canals,
I come to build water-channels for thee,
I come and I bring the cool water from Elephantine.'

The Pharaoh, as descended from Osiris, is here the irrigator and cultivator: then in the next passage he becomes identified with all vegetation:

'Nothing is made living without him, the Lord of Life,
Through thee the world waxeth green in triumph,
In thy nostrils, the tree and its leafage, the reeds, and the barley, wheat and fruit trees.'

The order of the names in the last two lines is significant not only of the progress from food-collection to food-production, but also of the sequence of the cultivated foods, barley, wheat, and fruit trees.

Then Osiris is identified with the Nile itself:

'Horus comes, he recognises his father in thee,
Youthful in thy name of "Fresh Water."'

Equally unequivocal is the address of Rameses IV to the god:

'Thou art indeed the Nile, great on the fields at the beginning of the seasons; gods and men live by the moisture that is in thee.

'The lakes fill, the canals are inundated by the purification that came forth from Osiris.'

But the King-god Osiris is not only identified with the life-giving properties of water, he is also intimately associated with the soil: 'With wide-spread arms, sleeping upon his side upon the sand, lord of the soil,' and, 'When thou movest the earth trembles.'

He is also a vegetation god: 'O thou lord of green fields,' and again, 'Lord of the overflowing vine.'

In the earliest version of the *Book of the Dead* the deceased says (of himself): 'I am Osiris, I have come forth as thou, I have entered as thou . . . the gods live as I, I live as the gods. I live as *Grain*. I grow as Grain. I am *Barley*.'

The representations of Osiris give further confirmation of the agricultural origin of this King-god, for Osiris is frequently figured with grain sprouting from his prostrate body. Sometimes a

tree is growing out of his coffin or tomb ; at other times the effigy of the god is deposited as a mummy, moulded of bruised corn and earth, and buried with the dead : or buried in the grain fields to ensure an abundant crop. Osiris is also shown wearing the bonnet of reeds worn usually only by the poorest class of husbandman ; and some of the Pharaohs are portrayed in stiff fluted trousers, copied from the ancient drawers made of woven fibres, which were worn by the earliest civilized cultivators of the Nile valley.

The Kings of Egypt were essentially agriculturists, and Herodotus tells us that the glory of Menes (the first king of the 1st Dynasty) was his protection of the Delta from flood by a great dyke. During the first six dynasties (3400–2625 B.C.) the whole of the left bank was basined and a few favoured sections of the right ; and when increasing population made it necessary, the great Pharaohs of the 12th Dynasty (2000–1800 B.C.) basined the right banks.

And as the nation expanded with a more fully organized agriculture, the association of the Kingship with agriculture, and the calendar which grew out of it, became more and more close, and eventually stereotyped. At last (by the Degree of Canopus) the King at his coronation took the oath never to alter the calendar which had come down from immemorial times.

CHAPTER VIII

EGYPTIAN FARM LIFE

THE IRRIGATION system of Egypt necessitated a highly centralized form of government, and the King became the centre from which radiated the control of the economic machine. National prosperity depended upon strict obedience to the King and his officers. This conception of the King, as the head and guardian of the State, endowed with all the virtues and rights of divinity, came down through the ages; and, when foreign sovereigns acquired control in Egypt, this concept dominated their conduct as completely as it had governed the actions of native monarchs. It was a theory of kingship which embodied much more than mere autocratic power over a people; for it identified national welfare with the king's welfare to such an extent as to imply that any personal misfortune to him would be inevitably accompanied by a corresponding calamity to the national life.

The Ptolemies, a Greek dynasty beginning about 300 B.C., took advantage of this, and with Greek acuteness and logic perfected the machinery of government to this end.

The King owned all the land-power. He let out large estates at a yearly rent to administrators, and these again let to smaller tenants who sometimes

sub-let in their turn. The crown peasants who were attached to the soil, and could only remove from it at the King's pleasure, were paid for their services, but could not refuse them. They must sow the land, gather the harvest, and pay the taxes. Similarly, the artisans must ply their crafts, the merchants their trades, and the herdsmen pasture their flocks (as their fathers before them); so ran the Law throughout the community, all being under the strict control of the State, and under obligation to pay to the King a large part of the produce of their labour.

But the organization of the State did not end here. Did a man wish to sell roasted lentils, then he must have a State licence and pay a tax. In some industries, the worker had not only to buy his raw materials from the State, but he had to show a guaranteed amount of manufactured product. The brewer, for instance, had to buy his barley from the State officer, guarantee a certain minimum quantity of beer, and deliver a fixed amount of it as tax to the State. But there does not appear to have been any compulsion that the beer, when purchased, should be paid for in barley (or other cereal), as was the custom in Babylonia.

Similarly, the vine-dresser had to secure a special licence to carry on his work, pay one-third of his produce to the State, and then an additional tax of one-tenth to one-sixth to the deified Queen Arsinöe. The bee-keeper paid in honey and the

shepherd in young animals, plus a money-tax on the wool obtained. The levies on the industry of the agriculturist did not end there, for he had to pay over part of the milk produce, pay for the work of his cattle which were the State property, and then a further tax was levied for the use of the State pasture-land.

Whether the weaver was better off than the farmer or shepherd we cannot tell, but he worked at a fixed wage for the State, and was allowed no share of the manufactured goods for himself.

One of the interesting cases on record is that of a swine-herd, Petos, who rented (not owned) 400 pigs for the annual payment of 211 little pigs. Petos absconded with the herd, leaving seven pigs and a few piglets behind. An order was given for the arrest of his sureties, if they failed within a stipulated time to refund to the State the money value of the stolen herd.

The rent for a herd of 144 she-goats was 216 young goats per annum, a higher rate than that of pig-farming; and as pigs were more prolific, this ratio seems inequitable, until one learns that goats were cheaper to feed than pigs.

Everything was as far as possible regulated by the State through its *nomarchs* (supervisors of a 'nome' or district), who not only superintended the proper cultivation of the soil, but also collected the taxes. They had discretionary powers, for if the Nile flood was very low in a given year, they were

empowered to reduce or even remit the tax; and in cases of honest necessity, to supply the seed-corn for the next harvest. On the other hand, a dishonest tenant would on conviction receive punishment, a form of bastinado being shown in one representation.

The State on its side took its duties just as seriously, for the Pharaohs were continuously winning land from the desert and the muddy delta; and as soon as the land was cultivable, it was registered, a rent was fixed, and then it was handed over to the nomarchs for cultivation.

Sometimes an excessive flood would sweep away banks and boundaries, and so a system of land-measurement became necessary, from which was ultimately evolved the science of geometry. At other times, a heavy flood would deposit tons of large rubble on a piece of land formerly very fertile. It then became the duty of the nomarch to re-assess the amount of tax until the land had been cleared and restored to its former fertility.

In an earlier chapter, mention was made of the pioneer work of the Egyptians in introducing and acclimatizing new plants, trees, and animals; and a short account of their food-stuffs will help to convey some idea of the extent of their agricultural and horticultural activities. Such an idea may be best derived from an imaginary record of a day in a nomarch's life. First he would issue his orders, and here is an actual letter (about 300 B.C.) form

Apollonius the nomarch to Zenon the farm-manager :

'The King has ordered us to sow the land twice. As soon as you gather the crops irrigate the soil immediately by hand, or if that is impossible allow as many shadoufs as possible to be operated and irrigate the land, but don't keep the water on the field longer than five days. After irrigation sow three-months' wheat. Write me when you have succeeded in gathering the first crops.'

This letter despatched, the nomarch visits the land under cultivation in his immediate neighbourhood.

Huge areas are growing barley of different kinds, two-rowed, four-rowed, and six-rowed barley, the historic crop of Egypt from which was made the beer which so surprised Herodotus on his visit to Egypt. He had left his native Greece, a land of wine-drinkers ; and, like most travellers, he found the customs of other nations strange when they differed from those of his own. There were two colours of barley—the red used for brewing, and the white for bread and temple offerings.

After seeing that the baker of barley loaves (who is also the brewer) has paid his taxes, the nomarch sets out on a visit to the wheat-fields. Here he finds modern wheat, or Syrian wheat as he calls it, in greater abundance than its predecessor, emmer ; and as he reflects upon the widespread activities of Egypt, in exploring the world for

things valuable in this or the future life, a field of bright green stalks with round yellow tops attracts his attention, and the nomarch comments on the forward state of the millet—a typical African crop.

At lunch he finds included in his dessert, figs, dates, melons, pomegranates and apricots, and he wonders how many of these are truly native fruits. His secretary, a scholarly Græco-Egyptian, tells him that from time immemorial the fig has been cultivated in Egypt.

King Snefru of the 4th Dynasty, says the learned secretary, grew them in his garden and in the 6th Dynasty even the sand-dwellers grew them; and the tale of Sinuhe (of the 12th Dynasty) mentions the fig-trees. In the 19th Dynasty, even the King's messengers ate figs as part of their rations; and 'as for the inferior sycomore figs which are sold to this day in strings in the bazaars of Heliopolis, have they not been known since the days of Menes?

'As for dates, though unpatriotic whisperers say these come from Arabia, do we not know that these can be found in our earliest records, yea even among the bones of those who knew not the art of writing?

'The apricot may have come from Persia; but our ancestors have long eaten the pomegranate, for refreshment when at work in the fields; or, at the close of the evening meal, drunk the nectar distilled from its seeds. The virtues of the decoction

made from its rind and roots are known to mothers whose babies suffer from intestinal worms.'

The conversation having taken this unpleasant turn, the nomarch rises from the table and visits the fruit gardens, where he compliments the vine-dressers on the excellent state of their bushes. For by this period, 300 B.C. and later, the Ptolemies were applying Greek science to their horticulture. Indeed most of the vine-owners and vine-dressers were immigrants from Greece, not only willing but glad to become Egyptians. They found the grape already there, as it had been from the beginning of recorded history, and they perfected its culture.

The nomarch spends half an hour examining the condition of the olives, for Egyptian gardeners were very anxious to produce a variety of olive as rich in oil of fine quality as the famous Greek olive. Rameses II had long ago established olive plantations at Heliopolis, from which were derived the oil supplies needed for the illumination of the royal temple; and the nomarch is very anxious to produce an oil of fine enough quality for this sacred purpose.

By practising methods of culture which the Ptolemies and their Greek experts had introduced, he is sanguine about the results of the coming harvest.

But our nomarch must hasten, for there is no twilight in Egypt: sunset is quickly followed by darkness. So he drives rapidly round to the gardens

where grow the foreign but acclimatized fruit trees, almond with its pink blossom, the pear and cherry all in white, the apple in red; while the lemon, citron, hazelnut, walnut, and peach all gladden his eye in various stages of fruition.

Retiring to his large and comfortable house, surrounded by flower gardens, he prepares for his evening meal by carefully washing his hands and feet; and then he calls for the menu. Beginning with lentil soup, flavoured with onion, garlic, or leek, with which he eats bread made of barley or wheat, he asks his servant what meats and vegetables there are to-day; and drinks grape or date wine while he scans the list.

He refuses the heavier meats such as beef, mutton, and veal; and chooses some goose, to be followed by goat's flesh, and for vegetables, asparagus and chickpeas or cabbage. With his cheese he takes celery, lettuce, radishes, and cress. For his second wine, he drinks the juice of the grape spiced with coriander, which in Pliny's time was grown to perfection in Egypt. The next morning, he writes a further letter to the farm-bailiff, saying he is paying a visit of inspection in his carriage, and ordering some barley for his horse, and some honey for himself, as he will stay overnight. (Such a letter was sent to a farm-manager by Artemidorus, a crown land-holder, in 33 B.C.)

Arrived at the farm, he is shown the cattle, tall long-legged beasts with large semi-circular lyre-

shaped horns; some tall beasts with horns directed upwards and outwards, others with a sort of hump level with the withers—the hornless cattle with a very high 'Chignon.' The oldest type is of the Hat-hor kind with small head, narrow chest, and thin shoulders, long well-curved spine, high and thin legs, muscular thighs, prominent hips, and small udders. The heavier type of cattle are imported stocks either from Asia or from "Negro" land.

Some of these cattle are black or piebald, a few are white, while the majority are fawn-coloured. The redder of the fawn ones are kept for sacrificial purposes; though all colours are offered as gifts to the temples, which frequently possess their own herds.

The herdsman, who is a very responsible personage, points with pride to the potential tender meat of the castrated bulls, and especially of the stall-fed cattle; for not much of the land can be kept under grass, when cereals are so much more profitable. A subordinate at the stalls is seen coaxing one animal with dough of bread, so that it may become especially fat; and he tells how 'long ago Rameses III gave a fattening-house to the gods.'

Among the sheep are seen two varieties, one with heavy long spiral horns and another with curved but short horns. But as the priests are forbidden mutton, the flesh is not in much request.

A larger herd of goats is attached to the farm,

but is fed on the scrub abounding on the edge of cultivation. Goats' flesh often replaces the venison from gazelles, which are occasionally hunted to keep down their depredation of the crops.

When the pigs are enquired after, the shepherd casts a contemptuous glance in the direction of the swine-herd. For the pig is an unclean animal at this period of Egyptian history, as it was in the time of Herodotus (450 B.C.); and its custodian is regarded as equally unclean.*

The nomarch, having completed the round of this side of the estate, sits down to a simple lunch of wheaten-bread and honey to which is added a cup of milk (warmed as was always the custom). His serving man takes his meal of lotus-bread or barley-bread, relished with an onion or some cloves of garlic, and washed down by copious draughts of barley brew. Then a stock of carobs is packed to sustain man and beast on the way. But before leaving the immediate precincts of the large house where he has slept, the nomarch takes a last walk

* Indeed the swine-herds were a caste apart, forbidden to intermarry with other Egyptians and even to enter the Temple. The priests never ate of pigs' flesh, and the people only once a year. 'On the eve of the festival of Osiris everyone slays a pig before his door; and restores it to the swine-herd that sold it, so that he may carry it away.' The tip of the tail, the spleen and the caul were wrapped in fat and burnt. The pig had become the embodiment of Set or Typhon, the enemy of Osiris. But in prehistoric times the pig as one of the incarnations of Hat-hor was revered, and in the 12th Dynasty a wine-store at Abydos was known as the 'Running Hog,' showing that it was not till a later time that the pig came down as much in Egyptian estimation as the domestic pig itself degenerated from the wild boar.

round the flower gardens just outside, which are stocked with native and foreign blooms.

He thinks how superior is the Egyptian cultivation of flower gardens even to that of Greece. There, flowers are grown only for a sacred festival or a victor's chaplet, while here they are tended for their own beauty; and he ponders on the graces to art resulting therefrom. (For Greek art has few representations of flowers, whereas Egyptian art abounds in them.)

For he knows that the Egyptian sees in flowers the essence of poetry. The rich man's walls are festooned and his tables garlanded with them. Ladies walk about with flowers in their hair and sometimes carry them in their hands.

Lovers' description of their fair ones borrow similes from flowers, trees, or fruit—'hair black as sloe, cheek sweeter than the first taste of dates.' And the lovers meet under the shade of great trees, the lady with a garland of persea blossom round her waist. When Pharaoh rides abroad in his chariot, a garland of flowers encircles his neck. Even the poorest deck themselves with flowers, the blue and red lotus being easily obtained; and sometimes even animals of the workers are adorned with floral wreaths and chains.

The tombs give evidence of this same love of flowers, for the sculptured figures of the blue lotus are unmistakable at the tomb of Ti. In their coffins, on beds of fresh flowers, lie mummies whose fore-

heads are crowned with circlets of blue, white, and red lotus. The mourners carry flowers before the funeral car, and file past the tomb with arms full of blossoms. The lotus and papyrus flowers are favourites; but the rich, such as our nomarch, cultivate round the pond of their gardens luxuriant varieties of roses, chrysanthemums, and narcissi; white lilies, oleanders, wild poppies, and corn-flowers.

His work done, our nomarch mounts his carriage which his man has ready, and, driving off across the level land, disappears over the horizon.

CHAPTER IX

BABYLONIAN AGRICULTURE

THERE ARE two sources of evidence concerning agricultural activity in the ancient civilizations: first, the remains of farming implements recovered by excavation; secondly, the evidence provided by sculptures and drawings. In both kinds, Babylonia is much more deficient than Egypt. Moreover, the agricultural literature of Babylonia is much scantier than that of Egypt; and what little there is deals mainly with the legal and commercial aspects of farming among a people much duller and less attractive than the Egyptians.

For example, a highly complex and successful system of irrigation was in use, but the details of its working are very vague. Far more is known of the relations of the agricultural labourer to his master than of the methods of cultivating the soil. We know the price of a sheep at two periods of Babylonian history, but beyond some statements of Herodotus very little else about sheep-farming.

This is what the observant Greek has to say:

'The Assyrians have but little rain; the lands however are fertilized and the fruits of the earth nourished by means of the river. This does not, like the Egyptian Nile, enrich the country by overflowing its banks, but is dispersed by manual labour or by hydraulic engines. The Babylonian district, like Egypt, is intersected by a number of canals, the largest of which [continued with a south-east course from the Euphrates to that of the Tigris where Nineveh stands] is capable of receiving vessels of burden. Of all countries which have come within my observation this is by far the most fruitful in corn. Fruit-trees such as the vine, the olive, the fig, they do not even attempt to cultivate; but the soil is so particularly well adapted to corn that it never produces less than two hundredfold; in seasons which are reasonably favourable it will sometimes rise to three hundred; the ear of their wheat as well as barley is four digits in size. The immense height to which millet and sesamum will grow, although I have witnessed it myself, I know not

how to mention. I am well aware that they who have *not* visited this country will deem whatever I may say on the subject a violation of probability. They have no oil but what they extract from sesamum.'

Let me deal with the statement about the two hundredfold yield in barley and wheat. To a Greek who knew the yield obtained at home, these figures would seem excessive ; but Herodotus points out the fertility of the soil and the method of irrigation employed.

Modern experimenters working under favourable conditions have easily outdone the figures quoted by Herodotus, and there is no good reason either for doubting his statements about the two hundredfold yield, or the size of the ears, four digits, i.e. four times the breadth of a finger, roughly three inches. It is interesting to note that wheat precedes barley in the quotation, indicating that at this date (about 450 B.C.) wheat was the cereal first in importance, though it is now known to have been later in coming into man's service. Sesame is a species of pulse, cultivated for the oil which can be pressed from it, just as we obtain linseed or coconut oil.

The date-palm was cultivated and was very fruitful. From it the people obtained bread, honey, wine, and vinegar. The stones were used by the smiths for charcoal, or, broken and softened, were used for fattening cattle and sheep. But these by no means exhaust the uses of this wonderful tree,

for (according to Gibbon) the natives celebrated in prose and verse three hundred and sixty uses to which were put its trunk, branches, leaves, juice, and fruit. The Babylonian had early learnt the art of fertilizing female palms by pollen from the male; and the British Museum has a sculpture showing a priest or king shaking the male cone over the female flower. The modern gardener assists in fertilizing marrows by a similar process.

Herodotus mentions that the production of date wine at Babylon was supplemented by supplies of grape wine brought down the river from Armenia in skin-boats. Coming from a land where wine was made from grapes, he was surprised to find a wine made from dates, just as he was in Egypt to find beer drinking. He makes, however, no reference to Babylonian beer, and this is the more remarkable since they brewed it from barley, as in Egypt. In both countries the bakers were the brewers. Babylonia, indeed, enjoyed some eighteen varieties of beer, and the oldest extant recipe for its brewing is Babylonian.

There was a very important regulation, too, in Babylonia with respect to the purchase and sale of beer. It could only be paid for by the equivalent amount of grain which had been destroyed in the production of the beer, and heavy penalties awaited the buyer and seller on discovery of evasion of the law. This law was designed to safeguard the available supply of barley for food. A beer was also

brewed from emmer (wheat), which was highly prized, and also no doubt highly priced.

As in Egypt, millet was grown in abundance, and grains of it were found in a late Assyrian sarcophagus.

The vine was introduced into Babylonia, and came from the north through Assyria, in whose sculptures it is represented. In the heyday of its prosperity the plain of the Euphrates-Tigris was a great orchard, and the Assyrian general Rabshakeh described his country to the Jews as ' a land of corn and wine, a land of bread and vine-yards, a land of olive oil and honey.' The vineyards were constructed in terraces as in Egypt, and as they still are in parts of Switzerland and Italy. It is clear that on a sunny aspect terraced vines will receive more sunshine than those on the level, and Babylonia, amply provided with terraced sun-traps, became famous for its high standard of horticulture. It had a greater native endowment of fruit-trees than Egypt, but like its ancient rival it also naturalized foreign trees.

Among the useful kinds grown in Babylonia the common fig, apple, almond, apricot, vine, and pistachio grew luxuriantly, while such ornamental trees as the plane, cypress, and acacia were very abundant.

Babylonia had domesticated for use as food two varieties of goat, one with black and the other with white fleece, and two kinds of sheep, white and

brown fleeced, the white wool being highly esteemed. The ox and the pig were also domesticated and slaughtered for food, while the horse and ass served man for riding or transport. Curiously enough, these beasts of burden are not depicted on the sculptures as being harnessed to the plough.

The dog helped in watching the herds of semi-domesticated gazelles or in hunting wild ones. These were so common that, where we should use the term cattle, the Babylonians used the word gazelles for herds and flocks. The herds of goats afforded a supply of kids as offerings in the temples, and occasionally kids formed a medium of exchange. Geese, ducks, chicken, and turtle-doves supplemented domestic supplies of food, and doves were a frequent sacrifice.

At an early date Babylonia had developed from her agriculture a very successful trading and commercial system. Besides the bazaars, every city was provided with a market-place where corn merchants had their stores, sellers of country produce their booths, and stalls were provided for the cattle, horses, and camels on sale.

Some details of agricultural business may be of interest.

In the eighteenth year of Darius (about 500 B.C.) a lady sold two hundred sheep on her farm in the country for £135,* and as part of the bargain she

* Of our pre-war money. See Sayce, *Social Life among the Babylonians and Assyrians*, pp. 59, 60.

undertook to send them into Babylon before payment.

The buyer had ten days' credit, and after this date he had to pay interest at the rate of 20 per cent. This high rate of interest was no doubt due to the insecurity of life and property and the shortness of life compared with that of our own times. In the reign of Cambyses, the immediate predecessor of Darius, eight fine sheep brought the equivalent of £8 14s., say 22s. each, as compared with 13s. 6d. in the first transaction mentioned; while in the fourth year of Nabonidos the King of Babylon (556–538 B.C.) a sheep cost about 18s. Similar variations are shown in the price of an ox, which in the twenty-fourth year of Nebuchadnezzar (605–562 B.C.) was £2, and had fallen to 30s. by the time of Cambyses.

Land tenure was very different from the Egyptian. Land had become private property, and, as in modern English practice, was sold, leased, or rented. Contracts were signed if the parties were literate; if unable to write, they indented their nail-marks on a soft brick which, when hardened, preserved the record of the transaction.

Sometimes a form of partnership was adopted, the owner of the land and the farmer going shares. This partnership might vary, from one-half to one-tenth of the produce going to the owner, while the farmer undertook to keep in order fences, houses, and other structures on the farm. Though

Herodotus does not mention the use of manure in Babylonia, we know that its value was understood, for an old Akkadian tablet refers to its use.

This tablet, the fragments of which are now in the British Museum, was one of several written for the instruction of people in their various professions. A translation from the Akkadian into Babylonian was made by scholars for Assurbanipal's library so that the knowledge in the dying Akkadian tongue should not be lost. Most of our knowledge of Babylonian agriculture and land tenure is derived from this tablet, which is the only direct source of information.

It will be noticed that the agricultural year began with the seventh month, after the harvest had been gathered. The farmer was expected to work from dawn to dark, and the land-owner supplied a long cart and the corn of the field—presumably the next year's seed corn. Anyone neglecting his land could be fined to the extent of the agreed rent, or, if the neglect continued, dispossessed.

Section VIII of Column II shows that the land was watered twice, so that perennial irrigation was already in vogue; and Section XVI indicates that some form of taxation by the State was also usual. Column III shows that not only were dates grown, but even dried off about October, and that, in this case, two-thirds of the dates was paid as rent or part of it. It will also be noted that ploughing

instruments are here referred to, but that no names are given.

The Babylonian and even the earlier Akkadian plough was already a complicated machine, with two handles and a funnel between them for drilling the seed. No actual ploughs have been found, and the figures shown below are those taken from representations on monuments or the walls of a palace.

EXTRACTS FROM TABLET OF ANCIENT BABYLONIAN AGRICULTURAL PRECEPTS

Column I

(First paragraph lost.)

II. In the sixth month (1) of the year (the agriculturist) marks his establishment.

III. He agrees about the covenant.

IV. He completes the wording of the covenant.

V. He collects his tax-gifts and surrounds the field with hedges.

VI. He brings together the gazelles (his flock) and gathers the birds.

VII. (He is to work) from dawn to dusk.

VIII. When the time of working the field comes, he ploughs, rakes, and divides it.

IX. For every sixty measures of grain the farmer takes eight measures, wheat, straw in stokes, grain thrashed and winnowed.

X. Field of half. In this case a field of culture is merely a field for culture.

XI. He (the agriculturist) goes as associate to his associate.

XII. He ploughs the fields, he keeps his seeds, he takes the birds together and gathers *manure*.

XIII. He waters the fields and multiplies the seeds.

XIV. When the time of working the field comes, he ploughs and rakes it, and the overseer reports to the overlord of the field.

XV. Field of partnership. He (the agriculturist) takes a field of partnership with the lord of the field.

XVI. Everything is made equal and on the same footing: man as man, house as house, seed as seed.

XVII. When the time of working (reaping) comes the master sends from his place as help a long cart, an ox for thrashing the corn, and the corn of the field.
(One paragraph lost.)

Column II

(Three paragraphs lost.)

IV. He draws water for the field.

V. He takes possession of the field.

VI. He fences with sticks the ground to be ploughed.

VII. He has the field ploughed and rakes it.

VIII. He waters it once and twice.

IX. He fixes hooks for the pails for drawing water.

X. When the time of working comes in a field of fifths, the farmer takes one part.

XI. As for the other divisions, he takes the percentage according to the division.

XII. In a field of a third, he takes a third.

XIII. In a field of a fourth, he takes a fourth.

XIV. In a field of a fifth, he takes a fifth.

XV. In a field of a tenth, he takes a tenth.

XVI. As for the tithe, he gives one part as tithe to the palace.

(One paragraph lost.)

Column III (Reverse)

I. Of property.

II. Various kinds of divisions (or land tenures), divisions of a half, a third, quarter, fifth, tenth division with a tithe.

III. Furniture and fixtures—
Furniture of the palace, fences, sticks for fences, poles, threshold ploughing instruments of the field, poles of the plantation.

IV. Enclosure (or garden).
Enclosure of the palace.
Enclosure of the lord.
Enclosure of the associate.

V. He (the agriculturist) marks the limit of his garden.

VI. He indicates the limits of his garden by means of boundary stones.

VII. He plants date trees in it.

VIII. He waters the young plants.

IX. He strengthens the walls.

X. He completes the paling of the garden.

XI. The lord of the garden may give to the farmer his dismissal.

XII. He pulls up the paling of the garden.

XIII. He extends one enclosure to the other.

XIV. He strengthens the walls.

XV. On the 30th of 8th month in fine weather.

XVI. At the time of drying dates.

XVII. At the time of pulling off the paling.

XVIII. In order to quit himself he delivers to the lord of the plantation two-thirds of the dates.

XIX. He takes a fixed amount, and he sends in money to the amount of the produce of the date trees.

Column IV

I. He makes secure the door and gate.

II. The servants' (or working) house and the dwelling-house also.

III. He establishes for his dwelling a dwelling-house as such. . . .

And so on to 19 paragraphs.

For further information the reader is referred to the works of Prof. Sayce quoted in the bibliography.

The gardens were irrigated by waters drawn from the canals, the shadouf being a common means of bringing the water to the higher level. Many vegetables were grown, and, as in Egypt, onions

and garlic were widely cultivated. Gardens almost invariably accompanied houses of any size, and the tenant who rented the house undertook to replace any fruit-trees which died or were cut down during the tenancy. The garden, too, when returned to the owner at the expiry of the lease had to be at least at the same pitch of cultivation in which the tenant originally received it.

The wealthy employed slaves to tend their gardens or fields; the poor irrigated their own. But the greater part of agricultural work was carried on by free men—as gardeners, irrigators, or herders of sheep, goats, and cattle.

The gardener and shepherd were highly esteemed, and tradition alleged that the great Sargon I, who founded the first Semitic Empire and the great library of Akkad, had been a gardener. He had been found, when a babe, in an ark of bulrushes floating on the Euphrates and been rescued and brought up by Akki the irrigator.

The Babylonian, unlike the warlike and commercial Assyrian, was essentially an agriculturist, and the cuneiform texts teem with references to gardens and the canals whence they drew their waters. Like the ancient Egyptians, the country people of Babylonia were an industrious peasantry, desiring peace that they might follow their agricultural pursuits, and 'disinclined for war and military operations.'

From these farmers of long ago there have come

down to us some of the songs by which the Babylonian peasant lightened his daily task. As they tended the plough they sang:

A heifer am I:
To the cow am I yoked:
The plough-handle is strong—
A shaft of Palm—
Lift it up, lift it up!

And when the harvest was gathered and the corn was being thrashed their voices rang out with:

My knees are marching,
My feet are not resting;
Working not thyself,
Drive me in company.

* * * * * *

In this brief survey an attempt has been made to show the fundamental importance of agriculture in the beginnings of civilization. And when the story of civilization in India and China, Greece and Rome is examined, the truth emerges that agriculture is not only universally the foundation of progress, but the condition of its existence.

In the same way, if the history of modern great States is investigated it will be found that all of them—France, Germany, and the United States of America—are indebted to agriculture for their

growth and expansion. And even in our own country, which a century ago led the industrial revolution of the world, and which is still a leading manufacturing country, the greatest industry of the land is Agriculture.

The Mayflower Press, Plymouth. William Brendon & Son, Ltd.

RENEWALS 691-4574

DATE DUE

OCT 13			

Demco, Inc. 38-293

C01906697

S
421
.G6

B1691455

Library
University of Texas
at San Antonio